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1984
Robert Peccia &
Associates
Capitol complex
pre-plan parking
facilities "84

Capitol Complex Pre-Plan Parking Facilities "84"

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ROBERT PECCIA & ASSOCIATES

Planners - Engineers - Designers

P.O. BOX 4518 810 HIALEAH COURT
HELENA, MONTANA 59604 (406) 442-8160

December 14, 1984

Mr. Clarence Hester, Chief
Design Bureau
Architecture & Engineering Division
Department of Administration
1500 East Sixth Avenue
Helena, MT 59620

Dear Mr. Hester:

Transmitted with this letter are ten copies of the report, Pre-Plan Parking Facilities "84", prepared by our firm for the Architecture and Engineering Division. This report contains a description of the work that was done for this project, a recommended parking lot layout, a drainage plan, and a cost estimate for improvements.

We believe that pre-planning these parking facilities was a wise decision by the Architecture and Engineering Division. While some conflicts will occur and some reconstruction will be necessary because of the time lines for the parking structure and surface lot improvements, these conflicts will be minimized with the pre-planning efforts that are described in this report.

We would like to thank the Architecture and Engineering Division for the opportunity to work with you on this project, and we hope you are pleased with the results.

Yours very truly,

ROBERT PECCIA & ASSOCIATES

Robert J. Peccia
President

RJP/mje
Enc.

CAPITOL COMPLEX
PRE-PLAN PARKING FACILITIES "84"


PREPARED FOR:

STATE OF MONTANA
DEPARTMENT OF ADMINISTRATION
ARCHITECTURE AND ENGINEERING DIVISION

BY:

ROBERT PECCIA & ASSOCIATES
HELENA, MONTANA

DECEMBER 1984



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CAPITOL COMPLEX
PRE-PLAN PARKING FACILITIES "84"

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STATE OF MONTANA

CAPITOL COMPLEX

Pre-Plan Parking Facilities

Introduction

The purpose of this investigation is to prepare a plan of parking improvements for the area south of the State Capitol Building just north of Broadway and from Roberts Street on the east to Montana Avenue on the west (see Figure No. 1).

Some parking lot improvements have already been done in this area. The parking lots just south of the State Capitol Building adjacent to Lockey were constructed in 1976. At that time it was contemplated that additional parking would be added between these parking lots and Broadway.

The Capitol Complex Parking Plan that was completed in October, 1976, shows the proposed parking improvements for this area. The Parking Plan shows surface parking for the west portion of the parking lot with a parking structure on the east side of the lot. The upper level of the parking structure would match the elevation and be a continuation of the surface parking lot. The lower level of the parking structure would match the grade of Roberts Street, where access to the lower level would be provided. It is not planned to provide a ramp to allow access from one level to the other.

In addition to the improvements shown in the parking plan, it may be possible that a parking deck over the existing developed parking lot adjacent to Lockey may be desired at some time in the future. This parking structure would be in lieu of the structure shown in the Parking Plan south of the Cogswell Building since the expansion of the Cogswell Building eliminated the possibility of a structure at this location.

Field Investigations

In order to provide a level of detail commensurate with the objective of matching current surface parking lot improvements with parking structures that may be constructed in the future, a fairly detailed level of field investigation was necessary. These investigations included a subsurface soil profile and survey (Appendix A) and a topographic survey of the site. These field investigations provided data on which to base preliminary design and cost estimates for proposed improvements.

SITE LOCATION MAP

PROPOSED PARKING LOT IMPROVEMENTS

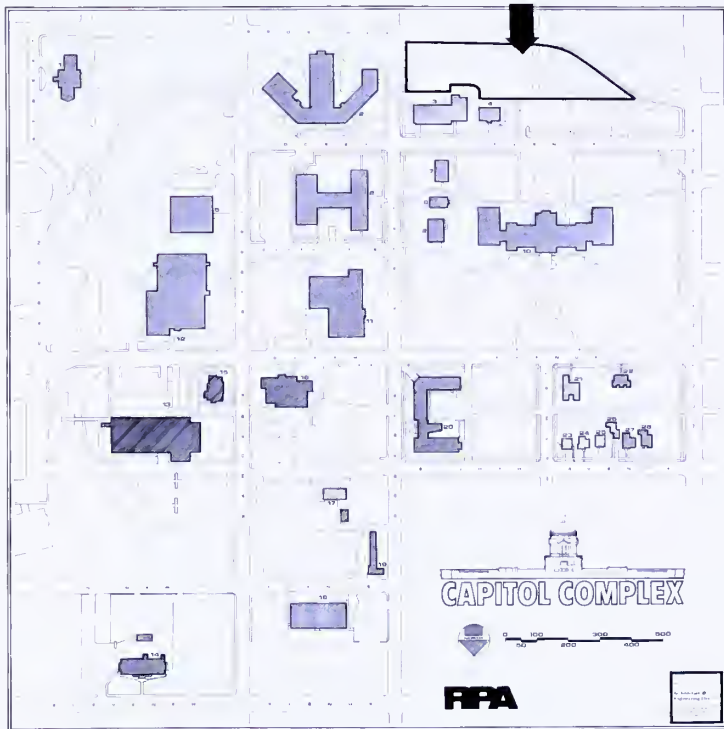


FIGURE 1

Proposed Parking Lot Layout

Using the Capitol Complex Traffic and Parking Study as a guide and considering possible structures behind the Employment Security Building and over the developed lot south of and adjacent to Lockey, a proposed parking lot improvement plan was developed. This plan anticipates an ultimate development of 183 surface parking spaces, 138 spaces on two levels in the structure behind the Employment Security Building, and 147 spaces on the two levels of the structure south of and adjacent to Lockey. These parking improvements will provide parking spaces similar to the number and location discussed in the Parking Plan. Figure No. 2 shows the anticipated parking improvements.

Drainage

The existing storm drains and inlets that were located from re-searching records, field inspections, and talking to the Capitol Complex Building Grounds Inspector are shown on Figure 3. The parking lot will be surface drained to an inlet on the north between the Employment Security Building and the old Health Building. This inlet will drain to a storm drain that will connect to the existing storm drain near Roberts Street.

Construction Conflicts

The objective of this pre-planning study is to provide data on the proposed parking improvements such that construction can occur and be sequenced in a logical manner. In preparing this plan, the following constraints were judged to be applicable.

1. The parking structure south of Lockey would not be constructed in the foreseeable future.
2. The parking structure behind the Employment Security Building would not be built for at least ten years.
3. The existing surface parking lot behind the Employment Security Building would receive sufficient maintenance so it would be serviceable until a parking structure is built.

The intent of this pre-planning study is to provide a basis of design so a minimum amount of reconstruction will be necessary. However, it should be recognized that the top deck of the proposed parking structure will not be at the same elevation as the existing surface parking lot. Therefore, it will be necessary to reconstruct a portion of the surface lot improvements that are expected to be constructed in 1985

when the parking structure is built. However, since it is expected that it will be at least ten years until the parking structure will be installed, the proposed surface lot improvements will provide a reasonable service life.

It should also be noted that the aisles for the new surface parking lot will not match exactly with the existing surface parking lot behind the Employment Security Building. However, the offset is not great, and the parking lots will be acceptable until the situation is corrected with a new parking structure.

Cost Estimates

Cost estimates were prepared for the surface lot improvements and the anticipated parking structure behind the Employment Security Building. No estimate was prepared for the parking structure south of and adjacent to Lockey Avenue since it is expected this structure will be too far in the future to accurately project costs at this time.

Table No. 1 shows the estimated costs for the surface parking and the parking structure behind the Employment Security Building. Appendix B contains the rationale behind the parking structure costs as provided by Carl Walker & Associates, a national firm experienced in parking structure design.

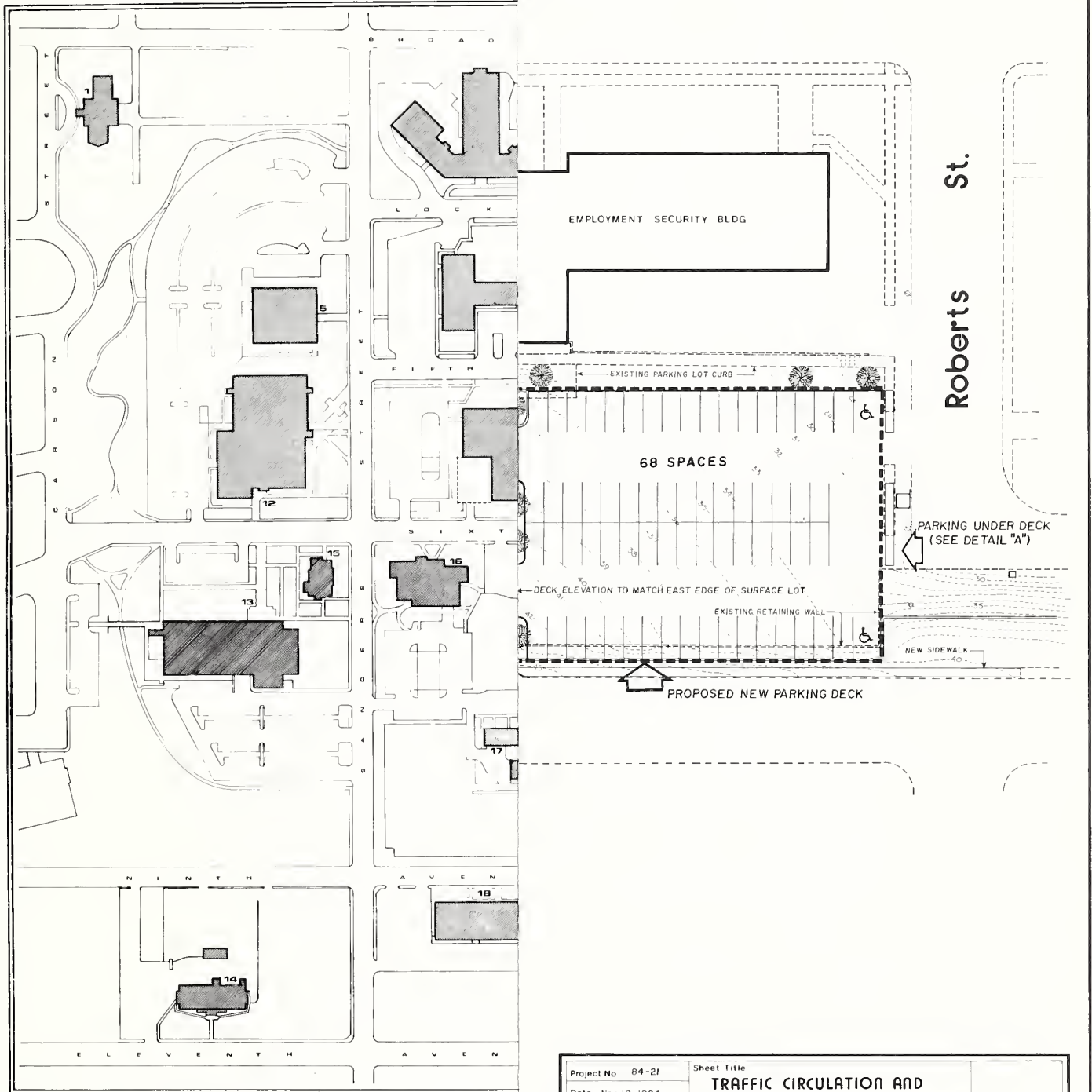
Parking Summary

The following table shows the existing parking spaces available in this block and the parking spaces that will be available after all parking improvements have been completed.

<u>PARKING SUMMARY</u>		
	<u>Existing</u>	<u>Proposed</u>
Unpaved Surface Parking	120	0
Paved Surface Parking	174	183
Parking Structure (Employment Security)	0	138
Parking Structure (Lockey)	<u>0</u>	<u>147</u>
Total	294	468

SITE LOCATIONS

PROPOSED PARKING LOT I

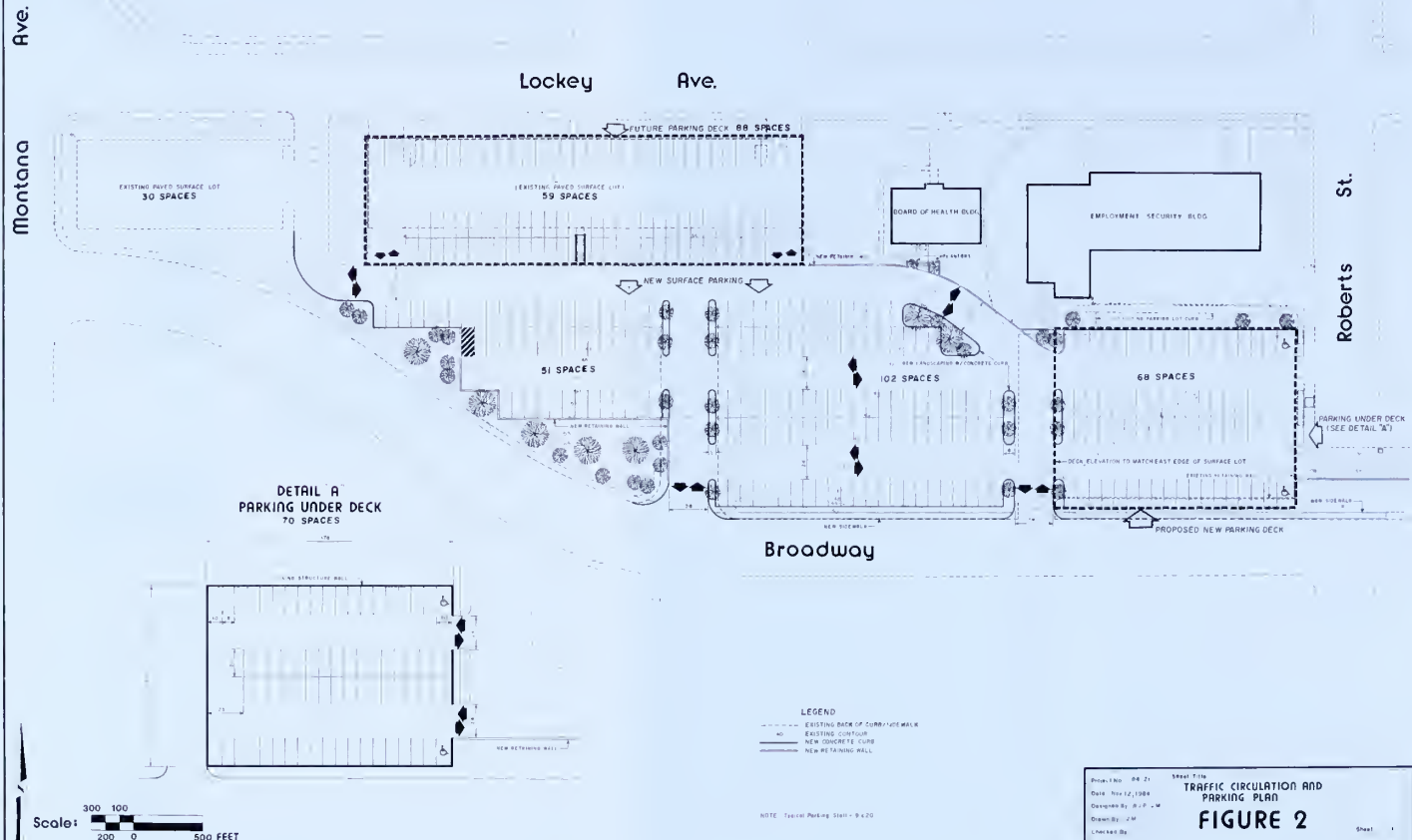


LEGEND

- | | | |
|---------------------------------|---------------------------|---------|
| 1. Executive Residence | 11. Museum | 19. St. |
| 2. Cogswell Building | 12. Justice Building and | 20. Sc |
| 3. E.S.D. Building | Montana State Library | 21. Of |
| 4. Old Board of Health Building | 13. D.N.R.C. Building | 22. Of |
| 5. S.R.S. Building | 14. Institutions Building | 23. 32 |
| 6. Mitchell Building | 15. Teacher's Retirement | 24. 12 |
| 7. Old Livestock Building | Building | 25. 12 |
| 8. Annex | 16. F.W.&P. Building | 26. 12 |
| 9. Boiler Plant | 17. Office Building | 27. 12 |
| 10. State Capitol | 18. Commerce Building | 28. 12 |

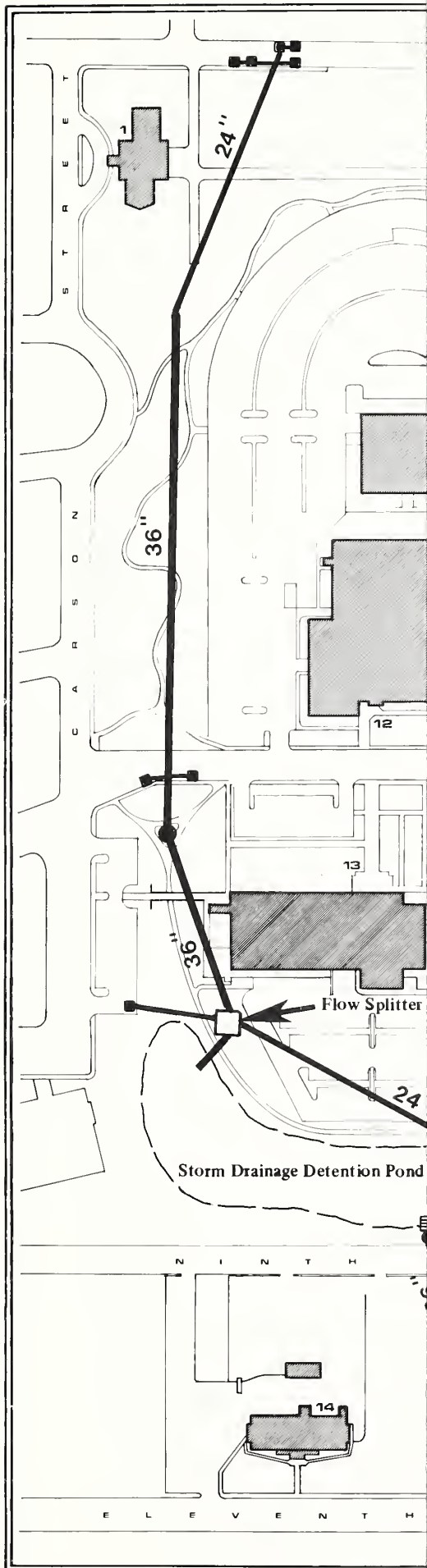
Project No. 84-21	Sheet Title	TRAFFIC CIRCULATION AND PARKING PLAN FIGURE 2	Sheet ____ of ____
Date Nov 12, 1984			
Designed By R.J.P., J.M.			
Drawn By J.M.			
Checked By		•Robert Peccia & Associates • Helena, MT • RPA •	

Capitol Complex Parking Lot Improvements








Project No. 88-21 Sheet No. 1
TRAFFIC CIRCULATION AND PARKING PLAN
FIGURE 2
 Date: Nov 12, 1988
 Designed By: R.P.P.
 Drawn By: J.M.
 Checked By:
 •Robert Peccia & Associates • Helena, MT • **RPA** •

DRAINAGE FACILITIES



LEGEND

-  MANHOLE
-  CATCH BASIN
-  DRAINAGE DITCH
-  STORM SEWER (EXISTING)
-  STORM SEWER (PROPOSED)

CAPITOL COMPLEX PARKING LOT IMPROVEMENTS

TABLE 1

Construction Cost Estimates

Item No.	Description	Estimated Quantity	Unit	Unit Price Mat. & Lab.	Estimated Amount
1.	Asphalt Surfacing (65,500 s.f.)	405	c.y.	\$ 160.00	\$ 64,800.00
2.	Landscaping	12,500	s.f.	1.00	12,500.00
3.	Concrete Curb and Gutter	1,020	l.f.	8.00	8,160.00
4.	2' High Concrete Wall (2' Above Grade)	255	l.f.	90.00	22,950.00
5.	3' High Concrete Wall (3' Above Grade)	250	l.f.	100.00	25,000.00
6.	New 5' Sidewalk (285 ft.)	1,425	s.f.	2.50	3,562.50
7.	On-Site Excavation and Embankment	1,256	c.y.	5.00	6,280.00
8.	Borrow Material in Place	737	c.y.	7.50	5,527.50
9.	Crushed Base Course (1½" Minus)	1,210	c.y.	18.00	21,780.00
10.	New 15" RCP Storm Drain	320	l.f.	32.00	10,240.00
11.	New Storm Drain Inlet	1	ea.	1,200.00	1,200.00
	Total Construction Cost				\$182,000.00
	Contingency (10%)				18,200.00
	Pre-Planning Study				9,115.00
	Design and Construction Engineering Cost (15%)				27,300.00
	Total Project Cost				\$236,615.00

See Figure 2 for Proposed Parking Lot Design

Cost to build a parking structure at the site of the existing Employment Security Building paved parking lot would be approximately \$663,000.00. (See Appendix B for Parking Structure Costs.)

APPENDIX A

SOILS REPORT



R.W. Gillespie & Associates, Inc.

CONSULTING ENGINEERS IN THE EARTH SCIENCES

December 8, 1984

Proj. No. 134-10

Robert Peccia & Associates
P.O. Box 4518
Helena, MT 59604

Attn: Robert Peccia, P.E.

Subject: Subgrade Soils Investigation and Preliminary Geotechnical
Investigation
Capital Parking Complex
Helena, Montana

Gentlemen:

As requested and authorized, we have conducted a subgrade soils investigation and preliminary geotechnical evaluation for the Capital Parking Complex in Helena, Montana. Following completion of the field work we discussed our findings and provided preliminary recommendations for pavement sections. The accompanying report describes the investigation, summarizes our findings, and presents our conclusions and recommendations.

Subsurface soils consist of fill and/or clayey silt with limestone fragments underlain by limestone of the Helena Formation. The fill required to raise parking grade will be locally available gravels. Therefore, the pavement section will be reduced somewhat from that of a natural soil subgrade.

We have enjoyed working with you on this project and look forward to a continuing relationship. If you have any questions, or if we may be of further service, please contact us.

Very truly yours,
Robert W. Gillespie & Associates

Robert W. Gillespie, P.E.

In Quadruplicate
Attachment



R.W. Gillespie & Associates, Inc.

CONSULTING ENGINEERS IN THE EARTH SCIENCES

REPORT
OF SUBGRADE SOILS INVESTIGATION
AND
PRELIMINARY GEOTECHNICAL EVALUATION

FOR
CAPITAL PARKING COMPLEX
HELENA, MONTANA

TO
ROBERT PECCIA & ASSOCIATES
HELENA, MONTANA

PREPARED
BY
R. W. GILLESPIE & ASSOCIATES
GREAT FALLS, MONTANA

DECEMBER, 1984



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R.W. Gillespie & Associates, Inc.

CONSULTING ENGINEERS IN THE EARTH SCIENCES

INTRODUCTION

In this report we present the results of our subgrade soils and preliminary geotechnical evaluation for the proposed Capital Parking Complex in Helena, Montana. The purpose of the investigation was to obtain information regarding subsurface conditions and soil properties on which to base recommendations for design and construction of pavements, and to provide preliminary evaluations of foundation conditions for a future parking structure.

The proposed parking area is roughly triangular in shape and is bounded by Broadway on the south and the Capital Complex on the east and north. The future parking structure will extend somewhat further than present parking surface, especially to the north and east. At least one level of the structure will be below grade.

Grading plans indicate fills of three to four feet will be necessary to provide level parking surfaces and access ramps. Locally available gravel sources are proposed as fills.

SITE INVESTIGATION

A rubber tired backhoe was used to investigate and sample subsurface materials. Six test pits were excavated to depths ranging from 1.1 to 8.6 feet in depth at the locations shown on Figure 1. Locations of test pits were determined by tape measurement from Broadway. Elevations were determined by level survey. Locations and elevations should be considered accurate only to the degree implied by the method used.

SITE AND SUBSURFACE CONDITIONS

Site

The parking site is located on Broadway, just south of the Capital Complex. Surface topography slopes downward from Broadway, to the north, with a maximum change in elevation on the order of 10 feet. The area is used as parking now with several sections having a gravel surfacing course.

Subsurface

Soils consist of fill and clayey silt with limestone fragments underlain by limestone. The fill ranges from 0.6 to 3.3 feet in thickness and is composed of gravelly sand surfacing course except at TP-6 where the sand is underlain by limestone rubble in a clayey silt matrix.

The natural clayey silt is a weathering by-product of the parent limestone. It is slightly plastic, gray in color, stiff, moist, and contains varying amounts of limestone fragments. Thickness ranges

R.W. Gillespie & Associates, Inc.

from 0 at TP-5 (rock outcrop) to more than 5 feet at TP-6 where rock was not encountered.

The limestone is rock of the Helena Formation. It is gray to dark gray with quartzite banding and close (2") joint spacing. Fracturing is intense near the contact but decreases rapidly with depth. Previous investigations at the Capital and Cogswell Buildings, combined with this study indicate the rock surface tends downward to the north. Structural dip appears to be to the northwest.

Groundwater

Groundwater was not encountered in any test pit at the time of excavation. Fluctuations in the groundwater may be due to seasonal temperature and precipitation events, and other variables no evident at the time of our investigation. An Evaluation of these factors is beyond the scope of this project.

EVALUATION OF GEOTECHNICAL DATA

Pavement Surfacing Sections

The controlling subgrade will be the locally available gravel fill which has a California Bearing Ratio (CBR) value greater than 50 percent by previous testing. Traffic is limited to automobiles and light duty trucks so the Design Traffic Number (DTN) will be on the order of 3. Using the procedures recommended by the Asphalt Institute we have generated several asphaltic concrete paving sections.

Future Foundations

The proposed parking structure will probably follow topographic breaks and have one level below grade. Review of subsurface data from this and surrounding projects suggests that a below grade level would place foundation on or into the limestone. The rock is a good bearing stratum but will probably require blasting for removal below the weathered zone. During the course of our studies at this and other sites around the Capital Complex, we have noted areas with abrupt changes in bedrock surface. TP-6 did not encounter rock at a depth of 8.6 feet which was the practical limit of the machine.

It should also be noted that Helena is a Zone 3 seismic classification by UBC and California standards. Recent intermountain seismic events have reinforced this zoning.

RECOMMENDATIONS

General and Site Preparation

1. All topsoil, organic material, and debris should be removed from the pavement areas.
2. After stripping, the site should be proof-rolled with a medium sized static roller with one pass in each direction.
3. Fill to bring the site to subgrade elevation should be clean (less than 10% passing the No. 200 sieve) minus 3-inch pitrum gravel. The fill should be placed in uniform lifts of 12 inch

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uncompacted thickness and be compacted to at least 98% of the maximum dry density as determined by ASTM D698.

Pavement Sections

4. Traffic and parking areas should be paved with one of the following sections, or an equivalent.

<u>Component</u>	<u>Thickness, Inches</u>		
Asphaltic Concrete	2.0	2.0	2.0
Asphalt Treated Base	3.0	--	--
3/4 " Crushed Base	--	--	2.0
1 1/2" Crushed Base	--	6.0	4.0
Totals	5.0	8.0	8.0

5. Base course and the top six inches of subgrade should be compacted to at least 98% of the maximum dry density as determined by ASTM D698.
6. Asphaltic concrete surfacing and treated base should be compacted to at least 97% of the maximum as determined by the Marshall Method, ASTM D1559.
7. Base course grading should meet the requirements of M100.02 of the Montana Department of Highways Specifications, 1981 edition. Crushed base is to be Type B.
8. Asphaltic concrete surfacing and base should meet the requirement of M100.03 of the MDOH specifications, 1981 edition. Plant mix surfacing should be Grade B. Plant mix base course may be Grade I or II.
9. Asphaltic concrete surfacing and base should have the following properties, as determined by mix design.

Property	Test Method	Surfacing	Base
Stability, pounds	ASTM D1559	800 min.	500 min.
Flow, 0.01 inch units	ASTM D1559	8-18	8-800
Air Voids	ASTM D3202	3-5	3-8 *
Voids in Mineral Aggregate (VMA)	MS-2, Asphalt Institute	14	12-14

* See MS-2 of Asphalt Institute.

Low Retaining Walls

10. Low retaining walls (less than 5 feet high) should be designed to resist an equivalent fluid pressure of 50 pcf. Footings should be proportioned for a maximum allowable contact pressure of 2500 psf.

Proposed Parking Structure

11. A complete geotechnical investigation should be performed for the proposed structure. The field investigation should include

R.W. Gillespie & Associates, Inc.

diamond core borings (NX or NQ) for determination of Rock Quality Designation.

Geotechnical Observation

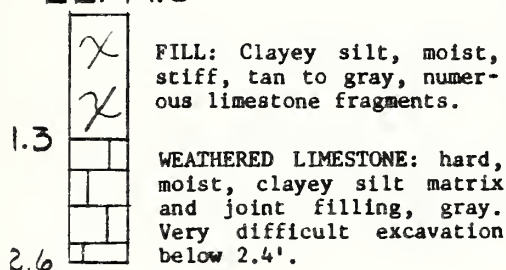
12. The geotechnical engineer should observe the earthwork and paving portions of the work to ascertain that subsurface conditions are similar to those used in the analysis.

This report has been prepared for the specific application to the subject project. In the event that any changes in the nature, design, or location of the parking area are made, the conclusions and recommendations in this report should be reviewed by R.W. Gillespie & Associates.

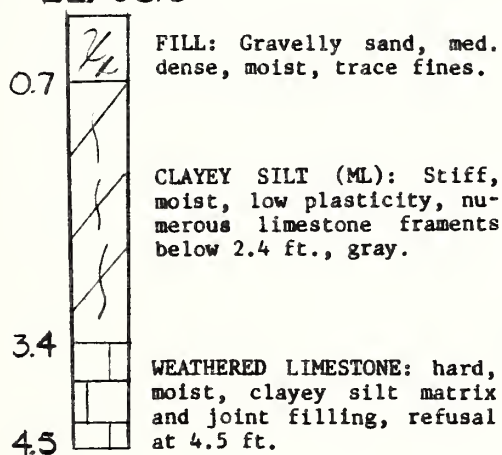
The recommendations presented herein are abased on the results of the referenced test pets. The nature and extent of variations between basings may not become evident until construction. If variations appear it will be necessary to reevaluate the recommendations presented in this report.

We request that we be provided the opportunity for a general review of the final design and specification s in order that earthwork and paving recommendations may be properly implemented.

TP-1
EL. 44.8



TP-2
EL. 38.3



EMPLOYMENT SECURITY BUILDING

KEY



DEPTH BELOW
GROUND SURF. 3.4

med.
dense.

with
stiff,

stiff,
limestone
feet,

LOCATION AND LOGS OF TEST PITS

SUBGRADE SOILS INVESTIGATION

CAPITAL COMPLEX PARKING

HELENA, MONTANA

ROBERT PECCIA & ASSOC. HELENA, MT.

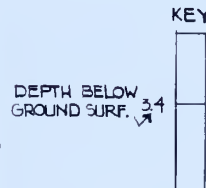
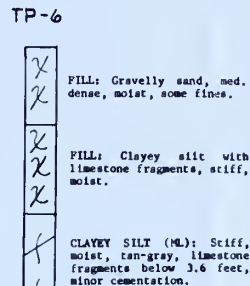
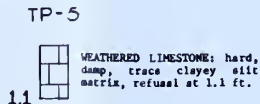
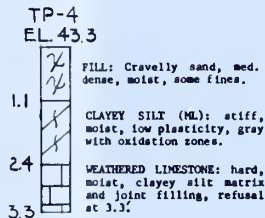
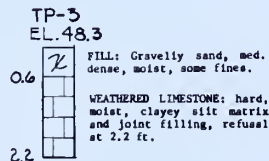
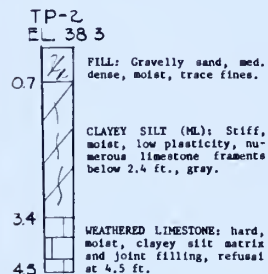
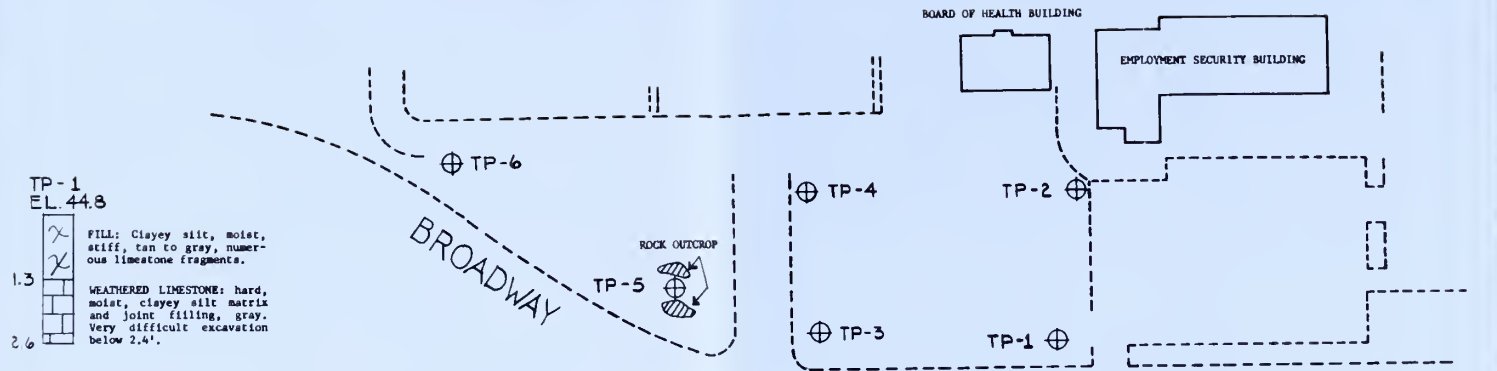
DATE

DEC. 1984

PROJ. NO.

134-10

FIG. 1



R. W. GILLESPIE & ASSOCIATES	LOCATION AND LOGS OF TEST PITS		
	SUBGRADE SOILS INVESTIGATION		
	CAPITAL COMPLEX PARKING		
	HELENA, MONTANA		
GREAT FALLS, MT.	ROBERT PICCIA & ASSOC. HELENA, MT.		
	DATE	PROJ. NO.	FIG. 1
	DEC. 1984	154-10	

APPENDIX B

PARKING STRUCTURE ANALYSIS

November 2, 1984



Parking Consultants
Restoration Engineers

Mr. Robert Peccia
Robert Peccia and Associates
P. O. Box 4518
Helena, Montana 59601

Helena, Montana

Re: Capitol Complex Parking Structure
Helena, Montana
(WALKER #236182.0)

Dear Bob:

Enclosed are three alternate designs for the referenced parking structure.

The first alternate is similar to your design except that the geometrics have been modified to represent current trends. An additional 18 spaces were gained, the total floor area decreased, and the efficiency improved. We estimate the cost of this facility will be approximately \$15.90 per square foot or a total cost of approximately \$663,000. This represents \$4,480 per stall.

The second alternate is a one way configuration with 70 degree angle parking. The number of stalls is more nearly equivalent to your original design but the floor area is decreased substantially and the efficiency improved. We estimate the cost of this facility will be approximately \$16.35 per square foot or a total cost of approximately \$614,000. This represents \$4,515 per stall.

Both of the previous schemes have flat floors with the parking structure constructed into a side hill. Direct access is thus provided to the upper and lower levels. However, this design precludes any future vertical expansion. As land continues to be used up for facilities expansion in the Capitol Complex Area, it will become more scarce and much more valuable. It may then be wise to develop a functional design which utilizes internal sloping floors and allows for future vertical expansion. Enclosed is an expanded view of one such scheme with minimum plan dimensions. The minimum dimensions result from rising 10 feet floor to floor at a maximum grade of 6%. We estimate the cost of this facility at approximately \$16.00 per square foot or a total cost of approximately \$816,000. This represents \$4,533 per stall.

We remain available to answer any questions you may have.

Sincerely,

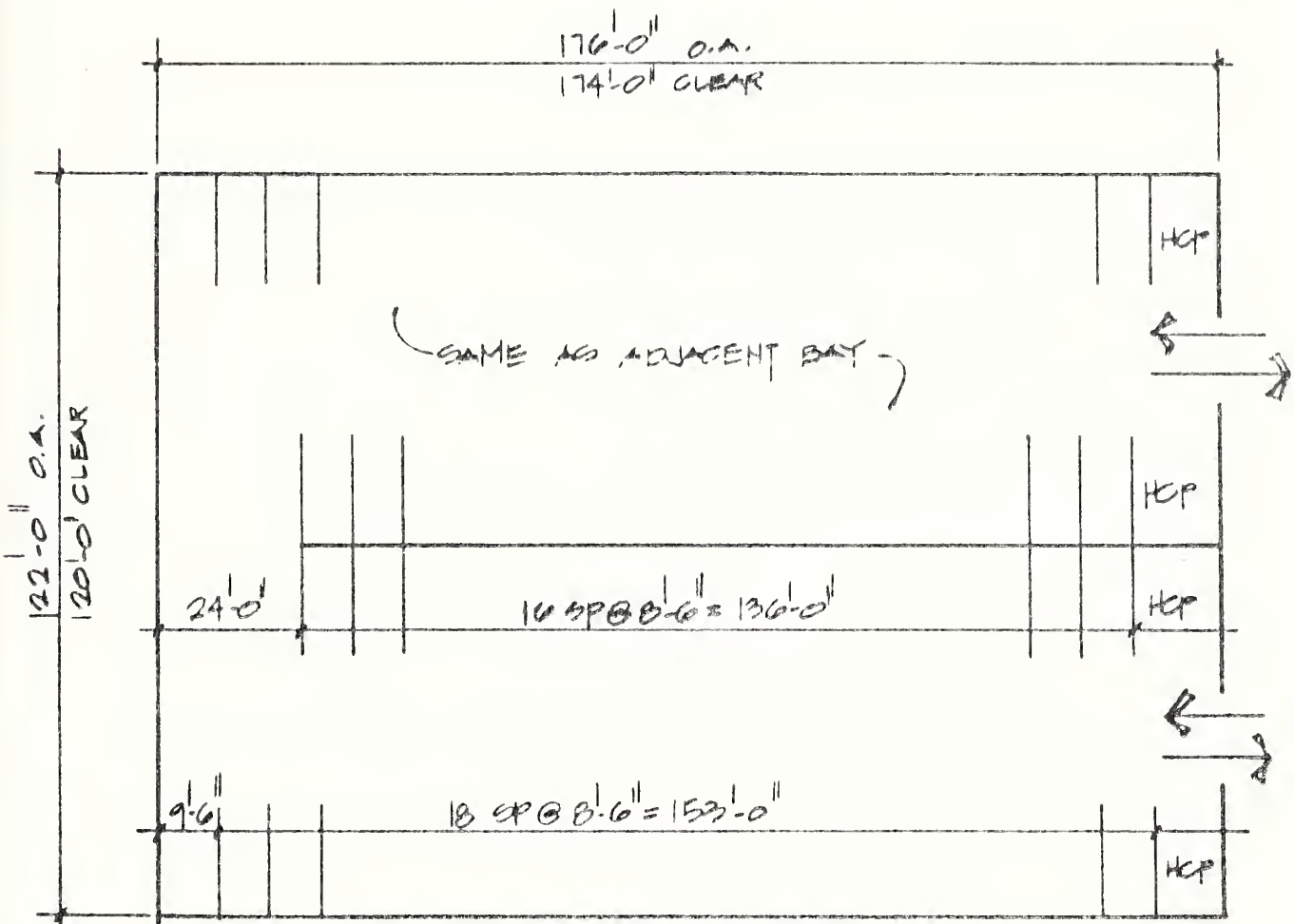
A handwritten signature in cursive script that reads "Donald Monahan".

Donald R. Monahan, P.E.
Vice President

DRM/pg

Suite 201
1502 South Parker Road
Denver CO 80231
303/337-2634

NOTE:
LEVEL 2 PLAN REVERSED.



SCHEME 1 TWO WAY TRAFFIC

1" = 30'

DATA:

74 STALLS / LEVEL

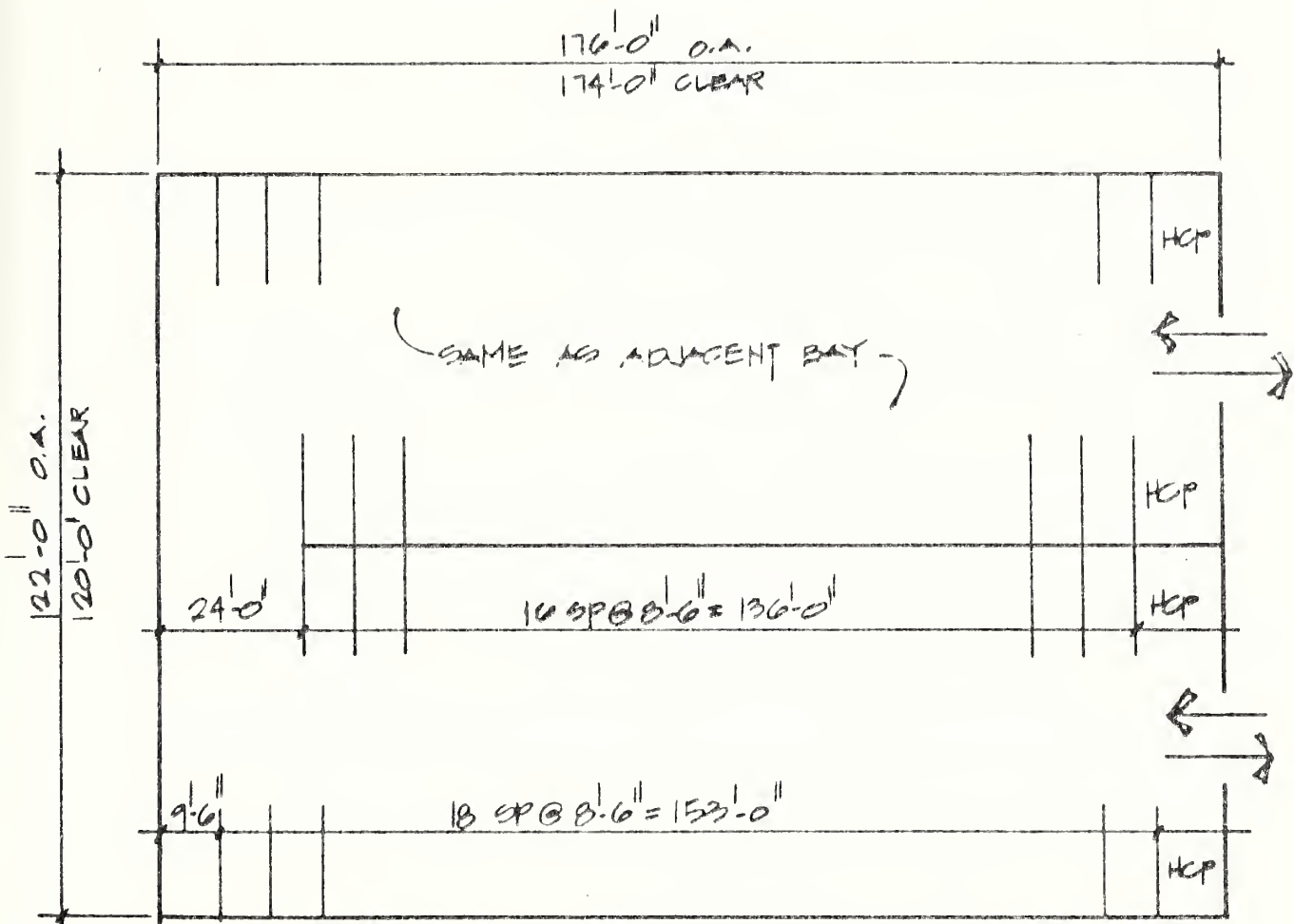
148 TOTAL STALLS (@ 90°)

41,760 SQ FT. TOT. AREA

282 SQ FT / STALL EFFICIENCY

walker Parking Consultants Restoration Engineers	
10-31-84	SK-1
236182.0	

NOTE:
LEVEL 2 PLAN REVERSED.



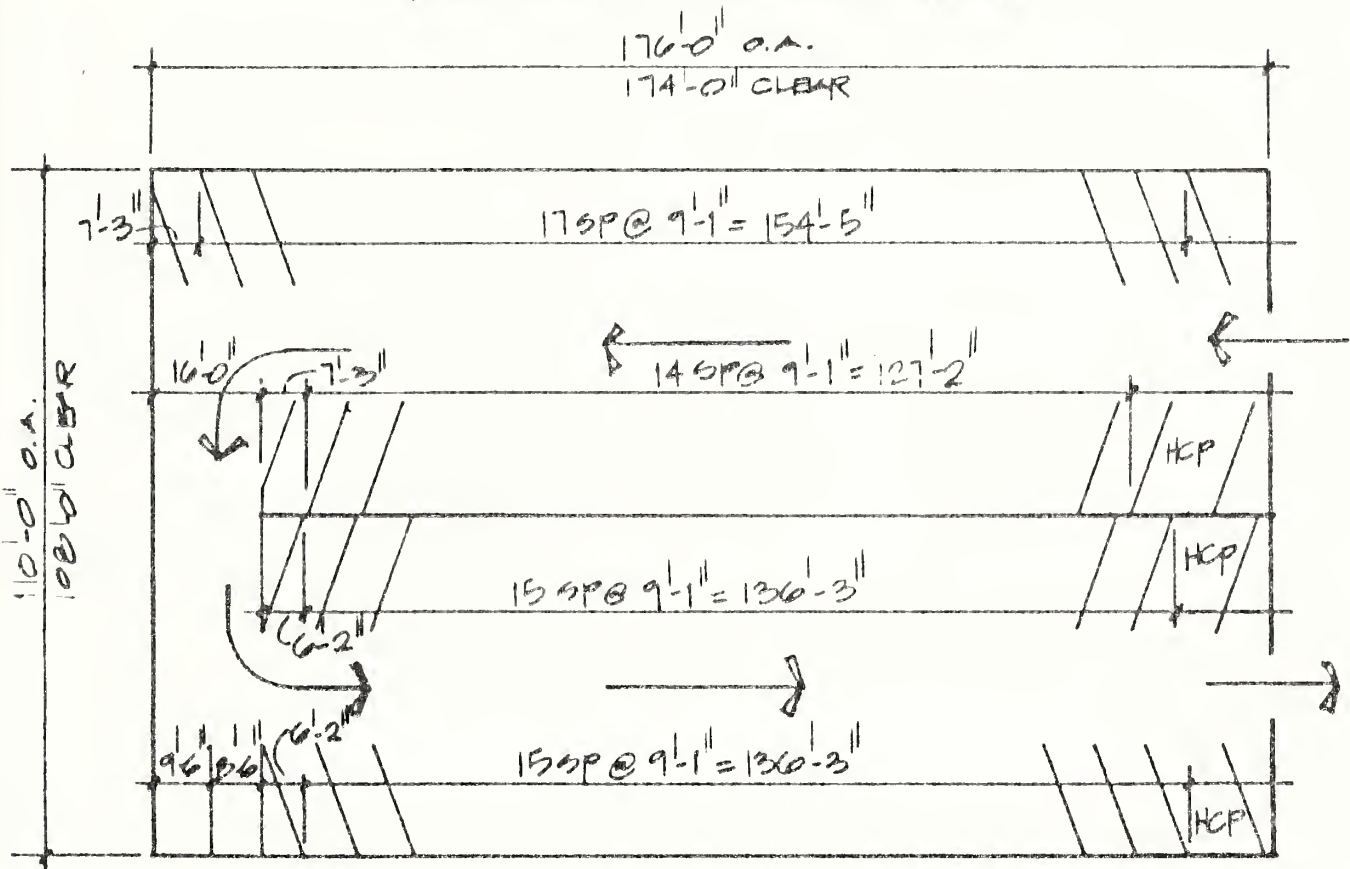
SCHEME 1 TWO WAY TRAFFIC

1" = 20'

DATA:
74 STALLS / LEVEL
148 TOTAL STALLS (@ 90°)
41,760 SQ FT. TOT. AREA
282 SQ FT / STALL EFFICIENCY

walker Parking Consultants Restoration Engineers	
10-31-84	SK-1
236182.0	

NOTE:
LEVEL 2 PLAN REVERSED



SCHEME 2 ONE WAY TRAFFIC

1" = 20'

DATA:
68 STALLS/LEVEL
136 TOT. STALLS (@ 70°)
37504 SQ. FT. PT. AREA
277 SQ. FT./STALL EFFICIENCY

walker

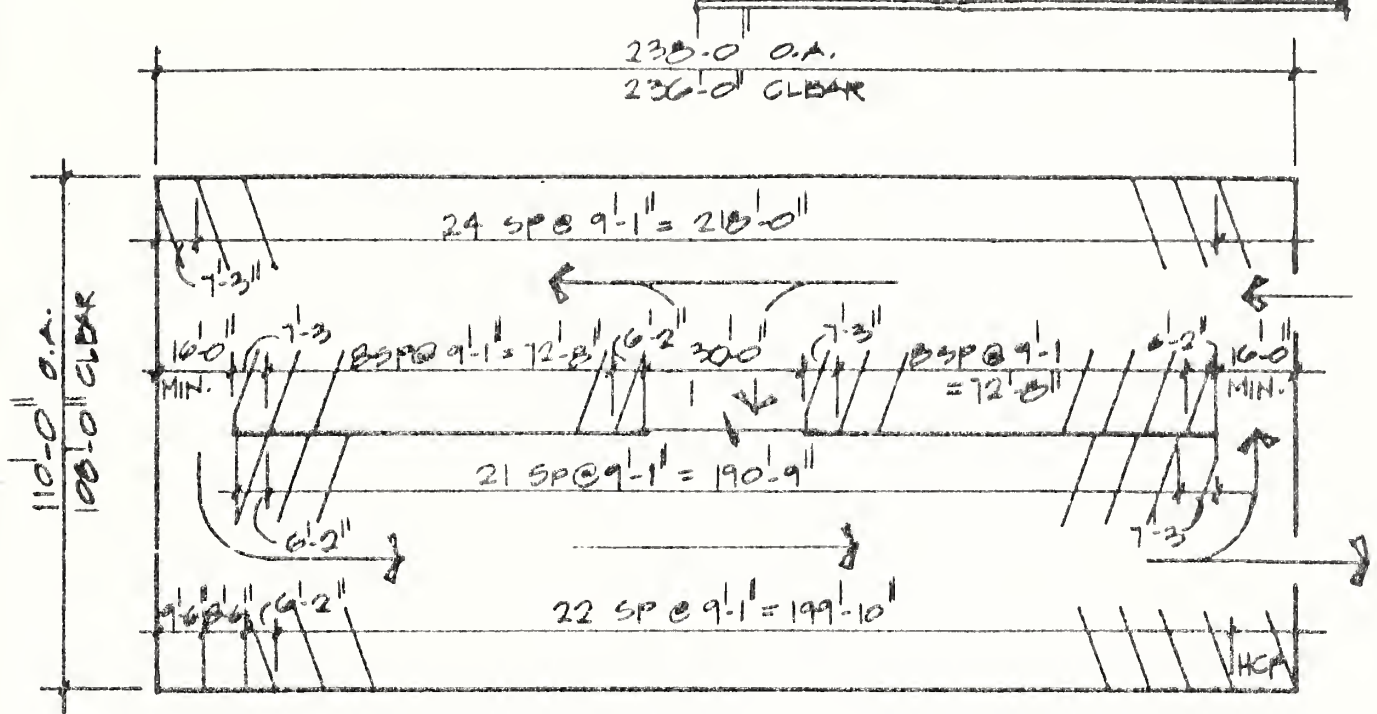
Parking Consultants
Restoration Engineers

10-31-84

236182.0

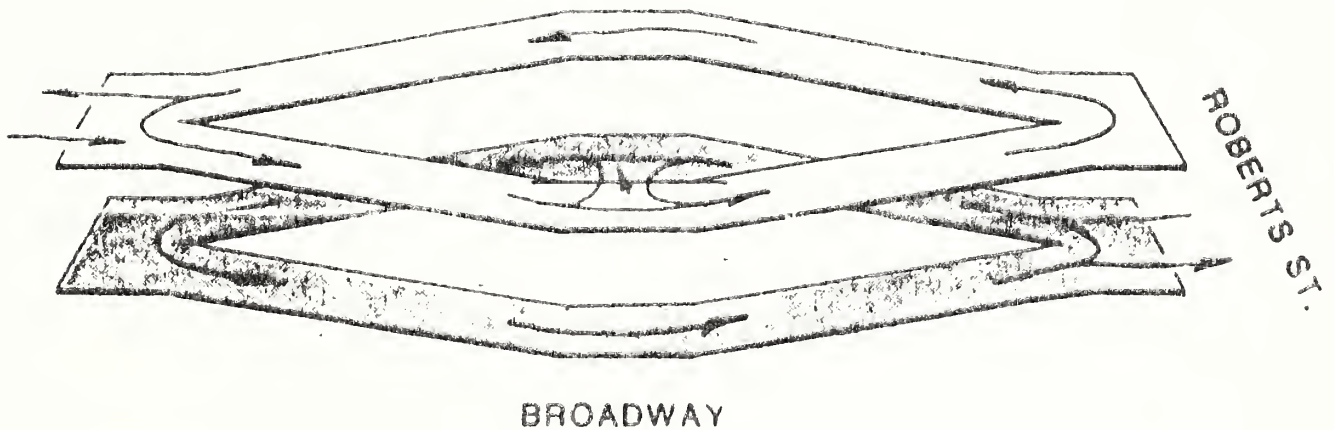
SK-2

NOTE:
LEVEL 2 PLAN IS REVERSED.



SCHEME 3 SEE EXPANDED VIEW BELOW

1" = 40'



EXPANDED VIEW LOOKING NORTH

DATA:
90 STALLS / LEVEL
180 TOTAL STALLS (@ 70°)
50,976 SQFT TOT. AREA
283 SQFT. PER STALL EFFICIENCY

walker	Parking Consultants Restoration Engineers
10-31-84 236182.0	SK-3

